The mathematical science of Christopher Wren

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Introduction

So much has been written on Wren, and so much research dedicated to his memory, that a new and different approach must begin with a little historiography to explain how it will complement what is already known and what particular problems already exist that it might help to solve.

That it is misleading to divorce the history of ideas from the study of their social, cultural or political contexts is now commonplace. The same is true of divisions within intellectual history – between the histories of science and art, technology, philosophy or economics. Organizational divisions, necessary in their own way, are difficult to bridge, not least because it is rarely clear where we should begin to build. The distortions they create are more commonly brought to light in the kind of masterly synthesis that establishes a new approach to an area of history, than in a scholarly monograph on a restricted and clearly defined subject.

Yet, occasionally, a problem can arise, whose source in an artificial division of labour is not difficult to guess. Just such a case is Wren.

From a modern point of view, Wren divided his career between two subject areas – science and architecture. As we look at the seventeenth century, the subjects seem even more distinct than today, since the decorative element played a much greater role in architecture. The fact that Wren now falls within the histories of both science and art has created many questions surrounding the change he made in the mid-1660s. He was educated, trained and enthusiastically involved in natural philosophy. At the height of a brilliant career he apparently abandoned science for what proved to be an even more successful career in architecture. How was he expected to fill the important post of Surveyor-General at a time of acute crisis? Of what relevance was his previous experience? How did he make so fundamental a shift?

We will find that, looked at within a seventeenth-century context, this change becomes less significant than it appears at first, but it leads on to more important questions. Wren's science has been persistently neglected

by his biographers and by the art historical studies of his architecture. It is natural, of course, to begin to look at Wren through his buildings, his most obvious legacy. But to neglect his early work and the period of his intellectual development is to lose a vital source in understanding his mature work in architecture. As we shall see, it is misconceived to couch this problem in terms of how Wren's 'science' influenced his 'architecture', but a study of his natural philosophy ought not only to fill a gap in our knowledge of his life, but also to enhance our understanding of his work as a whole.

Wren's science has been neglected. There are articles on particular subjects and isolated problems, and each of the many books recognizes his early career as an astronomer and his general interest in many branches of natural philosophy. What we seem to need is a fuller, coordinated account that can aim at general interpretative conclusions and, in turn, at analyses of particular problems such as our first – what one writer has called the 'scientist, suddenly turned architect' (Fuerst, 1956, p. 119).

The second problem, that of the influence of Wren's early career, is especially acute, since the one-sided approach to Wren has created difficulties – particularly when it comes to interpreting the theory behind the architectural form and relating it to an intellectual context. To understand this we begin by following a few of the more sensitive and penetrative studies of Wren, in their progress backwards from the buildings to the philosophy and its source.

The art historian typically approaches Wren's work in terms of an established critical framework derived from the stylistic development of contemporary European architecture. The most obvious feature of this framework are the two categories Renaissance and Baroque, and the primary question is how Wren's architecture will relate to the developing European style when England has played only a small part in the mainstream progression. The conclusion, it seems, is that Wren does not fit easily into either camp.

In his classic *Outline of European architecture,* Pevsner sums up this conclusion by saying that: 'Wren's style in churches and palaces is classical, no doubt, but it is a Baroque version of classicism' (Pevsner, 1968, p. 326). Wren seems to fall between the Renaissance and the Baroque, while somehow partaking of both at once. Looked at one way, the restraint and order of Wren's intellectual approach to design would place him on the classical side, and yet he feels free to break established rules and use classical elements in unconventional ways. From another view, this 'impurity' of style gives his work an affinity with the more free expression of

the Baroque, and yet he never seems really in sympathy with the true Baroque spirit.

These conclusions are not, of course, original, but are drawn out of the important accounts of Wren's architecture. The tension which is common to each analysis is something more subtle and important than the mere fact that Wren's style changes and develops through his career. Summerson, for example, speaks of 'a strain of inconsistency running through the whole of Wren's work' (Summerson, 1949, p .79). Again, Summerson writes of work that 'falters between the static unity of the "high" Renaissance and the dynamic, emotional unity of the Baroque' (Summerson, 1949, p. 85), and Sekler describes Wren as 'a follower of a classical ideal forced by the artistic climate of his time to achieve Baroque creations' (Sekler, 1956, p. 94).

The language of these analyses is very significant, with key words such as 'inconsistency', 'falters', 'forced'. To accept them is not to conclude that Wren himself was either inconsistent, or faltering, or forced, but that this is how he appears, viewed from a particular critical standpoint. Perhaps Summerson best sums up the position with a nicely apologetic sentence, where he says:

> That Wren was not by temperament in accord with the Baroque spirit is perfectly clear; but it is equally clear that in such designs as Hampton Court and Greenwich he was handling classic forms in a loose, unconventional fashion which, allowing for a strong individual trend, can be called by no other name.
>
> Summerson (1949), p. 84.

The conclusion is extremely interesting and perfectly valid, provided we remember that its dualism has not originated from an internal study of Wren, but has been imposed from without, originating in a development not necessarily related to Wren's own thinking. A study of Wren's thought and intellectual background ought to help us to understand why his architecture should appear thus from this viewpoint. However, serious problems do arise when the analysis is carried further and used as a key to understand Wren's own ideas.

Of Wren's five commentaries on the theory of architecture, the one that seems to promise most in this respect is that labelled 'Tract I' by his son and published in the *Parentalia.*[1] One key paragraph has always been quoted as a summary of Wren's philosophy of beauty:

> There are natural Causes of Beauty. Beauty is a Harmony of Objects, begetting Pleasure by the Eye. There are two Causes of Beauty, natural and customary. Natural is from Geometry, consisting in Uniformity (that is Equality) and

> Proportion. Customary Beauty is begotten by the Use of our Senses to those Objects which are usually pleasing to us for other Causes, as Familiarity or particular Inclination breeds a Love to Things not in themselves lovely. Here lies the great Occasion of Errors; here is tried the Architect's Judgment: but always the true Test is natural or geometrical Beauty.
>
> C. Wren (1750), p. 351.

Now, each writer on Wren has taken 'natural' and 'customary' to correspond with familiar categories in architectural history – natural beauty, 'from Geometry', being that of the Renaissance theorists who held that correct forms and proportions could be demonstrated objectively on geometrical grounds and could provide an unchanging rule-book for design; and customary beauty, 'begotten by the Use of our Senses', being the more subjective criterion of the moderns, a sanction for free and imaginative expression and the architecture of the Baroque. So, it is said, Wren identified two kinds of beauty, and this corresponds neatly with the result of stylistic analysis where, in practice, he seemed to embrace, in part, both the classical and the Baroque.

There are two immediate problems. One is that we have already seen Wren condemn customary beauty as 'the great Occasion of Errors'. He seems rather to introduce it as a warning, and his clear preference (leaving aside for now just what the concept was) was for natural beauty: 'always the true Test is natural or geometrical Beauty'.

Some writers (for example Sekler, 1956, and Whinney, 1971) accept this and they are left with an unsatisfactory divergence between theory and practice for, if Wren's 'natural or geometrical Beauty' corresponds to the Renaissance concept, he was far from consistent in its application.

Others minimize Wren's strictures and link the compromise they have seen in his architecture with a corresponding ambiguity in theory. Downes finds it 'entirely in character that Wren admits two kinds of beauty' (Downes, 1971, pp. 48–9), while Summerson says that: 'Wren joins hands with the most primitive and the most modern exponents of architectural aesthetics' (Summerson 1953, p.134). The difficulty here, of course, is that the two concepts of beauty are incompatible and it would be difficult to take Wren seriously as an aesthetic theorist if he did not realize this.

Fuerst carries this position to its logical conclusion, when he says that Wren's theory 'reveals a latitudinarianism capable of embracing two entirely different, contradictory and mutually exclusive canons of art' (Fuerst, 1956, p. 173), and concludes that:

> Wren's work can show parallels to the Renaissance as well as to the Baroque, and that Wren could regard beauty from the contradictory points of view of classicism and romanticism.
>
> Fuerst (1956), p. 178.

Can we seriously believe that Wren was so oblivious to the implications of his theory? The source of so curious a stance has been sought in the fashionable attitudes of the Royal Society – 'scientific scepticism . . . doubt in immutable standards and *a priori* assumptions' (Fuerst, 1956, p. 175). But the virtuosi will hardly thank the historian who finds their scepticism the source of such muddled thinking.

No, this conclusion itself indicates that, somewhere, we have taken a wrong turning. It must surely be better to begin at the beginning, to examine this scientific background of Wren's – its nature and content – and allow it to throw light on both his aesthetics and his architecture.

An account of Wren's natural philosophy, as well as revealing, in detail, a neglected side of his life, ought to tackle certain particular problems. One is the nature of the shift Wren made in mid-stream from science to architecture. The other is the attitudes and philosophy he carried with him. A study of his formative years must help with some of the difficulties that have dogged a full understanding of the whole of his work.